

REMARKS

In the last Office Action, the Examiner rejected claims 2-6 under 35 U.S.C. §112, second paragraph, for indefiniteness. Claim 14 was rejected under 35 U.S.C. §102(b) as being clearly anticipated by U.S. Patent No. 5,184,433 to Maack. Claims 1, 7 and 15 were rejected under 35 U.S.C. §102(a) as being clearly anticipated by U.S. Patent No. 6,471,570 to Minami et al. ("Minami"). Claims 8-13 were rejected under 35 U.S.C. §103(a) as being unpatentable over Minami. Claims 2-6 were indicated to be allowable if rewritten or amended to overcome the rejection under 35 U.S.C. §112, second paragraph. Additional art was cited of interest.

Applicants and applicants' counsel note with appreciation the indication of allowable subject matter concerning claims 2-6. However, for the reasons noted below, applicants respectfully submit that amended claims 1 and 7-15 also patentably distinguish from the prior art of record.

In accordance with the present response, original independent claims 1 and 7 have been amended to further patentably distinguish from the prior art of record. Allowable claims 2-6 have been amended to overcome the rejection under 35 U.S.C. §112, second paragraph. Claims 1-15 have also been amended in formal respects to improve the wording thereof and to bring them into better conformance with U.S. practice. A new abstract which more clearly reflects the

invention to which the amended claims are directed has been substituted for the original abstract.

In view of the foregoing, applicants respectfully submit that the rejection of claims 2-6 under 35 U.S.C. §112, second paragraph, has been overcome and should be withdrawn.

Applicants respectfully request reconsideration of their application in light of the following discussion.

Brief Summary of the Invention

The present invention is directed to an end face polishing device and to a method for polishing the end face of a workpiece.

As described in the specification (pgs. 1-2), conventional end face polishing devices have not been able to polish the end faces of workpieces with high efficiency and high polishing speed. For example, the conventional end face polishing devices have been unable to polish end faces of workpieces with an optimum polishing speed while ensuring a uniform wearing of a polishing sheet.

The present invention overcomes the drawbacks of the conventional art. Figs. 3-6 show an embodiment of an end face polishing device and method according to the present invention embodied in the claims. The end face polishing device has a polishing disc 10 for supporting a polishing sheet having a polishing surface. A driving unit (e.g., revolution shafts

50, 300; rotational shaft 80; motor 200; transfer gears 100, 101; and transfer unit 90) for driving the polishing sheet to impart a roulette-like motion to the polishing sheet while rotating the polishing sheet about a rotational axis. (The roulette-like motion is described on pg. 2, lines 10-12 and pg. 4, line 24 to pg. 5, lines 1-4, and is shown in Fig. 3). A pressing unit presses a workpiece during driving of the polishing sheet by the driving unit to bring an end face of the workpiece into pressure contact with the polishing surface so that the polishing surface lies in a plane parallel to the end face of the workpiece. By this construction and method, the end face of the workpiece can be polished with high efficiency and at a higher speed as compared to the conventional art.

Traversal of Prior Art Rejections

Rejections Under 35 U.S.C. §102

Claim 14 was rejected under 35 U.S.C. §102(b) as being anticipated by Maack. Applicants respectfully traverse this rejection and submit that amended claim 14, which now depends on claim 7, recites subject matter which is not identically disclosed or described in Maack.

Independent claim 7 is directed to a method for polishing an end face of a workpiece and requires the steps of providing a polishing sheet having a polishing surface,

driving the polishing sheet to impart a roulette-like motion to the polishing sheet while rotating the polishing sheet about a rotational axis, and pressing a workpiece during driving of the polishing sheet to bring an end face of the workpiece into pressure contact with the polishing surface so that the polishing surface lies in a plane parallel to the end face of the workpiece to thereby polish the end face of the workpiece.

Claim 14 has been amended to depend on amended independent claim 7 and includes the additional limitation that the driving step includes the step of driving the polishing sheet using an XY movement table.

Maack discloses a method and apparatus of polishing the end of an optical fiber. Polishing is accomplished by producing relative lateral movement between the end of the optical fiber and an abrasive surface while changing the angle of attack of the relative movement at a rate greater than about 10,000 arc degrees per second. However, Maack does not disclose or suggest the steps of driving a the polishing sheet to impart a roulette-like motion to the polishing sheet while rotating the polishing sheet about a rotational axis, and pressing a workpiece during driving of the polishing sheet to bring an end face of the workpiece into pressure contact with the polishing surface so that the polishing surface lies in a plane parallel to the end face of the workpiece, as required

by amended independent claim 7 from which amended claim 14 depends. Stated otherwise, the relative lateral movement produced between the end of the optical fiber and the abrasive surface in Maack does not constitute roulette-like motion, as required by independent claim 7. Furthermore, since the angle of attack of the relative movement in Maack is varied, the surface of the polishing sheet does not lie in a plane parallel to the end of the optical fiber during relative movement between the polishing sheet and the end of the optical fiber, as required by amended independent claim 7.

In the absence of the foregoing disclosure recited in amended independent claim 7, from which amended claim 14 depends, anticipation cannot be found. See, e.g., W.L. Gore & Associates v. Garlock, Inc., 220 USPQ 303, 313 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984) ("Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration"); Continental Can Co. USA v. Monsanto Co., 20 USPQ2d 1746, 1748 (Fed. Cir. 1991) ("When more than one reference is required to establish unpatentability of the claimed invention anticipation under § 102 can not be found."); Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co., 221 USPQ 481, 485 (Fed. Cir. 1984) (emphasis added) ("Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim").

Stated otherwise, there must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention. This standard is clearly not satisfied by Maack for the reasons stated above. Furthermore, Maack does not suggest the claimed subject matter and, therefore, would not have motivated one skilled in the art to modify Maack's polisher to arrive at the claimed invention.

In view of the foregoing, applicants respectfully request that the rejection of claim 14 under 35 U.S.C. §102(b) as being anticipated by Maack be withdrawn.

Claims 1, 7 and 15 were rejected under 35 U.S.C. §102(a) as being anticipated by Minami. Applicants respectfully traverse this rejection and submit that amended claims 1, 7 and 15 recite subject matter which is not identically disclosed or described in Minami.

Amended independent claim 1 is directed to an end face polishing device for polishing an end face of a workpiece and requires a polishing sheet having a polishing surface, a driving unit for driving the polishing sheet to impart a roulette-like motion to the polishing sheet while rotating the polishing sheet about a rotational axis, and a pressing unit for pressing a workpiece during driving of the polishing sheet by the driving unit to bring an end face of the workpiece into pressure contact with the polishing surface so that the

polishing surface lies in a plane parallel to the end face of the workpiece to thereby polish the end face of the workpiece. No corresponding structural and functional combination is disclosed or suggested by the prior art of record.

Minami discloses an end surface polishing machine having a drive mechanism for driving a polishing member to undergo rotational and revolving movement. Rod-shaped members are pressed against a surface of the polishing member during rotational and revolving movement thereof to polish the end faces of the rod-shaped members. However, Minami does not disclose or describe a driving unit for driving the polishing sheet to impart a roulette-like motion to the polishing sheet while rotating the polishing sheet about a rotational axis, and a pressing unit for pressing a workpiece during driving of the polishing sheet by the driving unit to bring an end face of the workpiece into pressure contact with the polishing surface so that the polishing surface lies in a plane parallel to the end face of the workpiece, as recited in amended independent claim 1. More specifically, the locus of the rod-shaped members pushed onto the polishing member due to revolving and rotational movement of the revolving and rotation shafts of Minami's drive mechanism results in the continuous donut-shaped locus 62 shown in Fig. 4B of Minami. In contrast, the locus of the workpiece resulting from the roulette-like motion and the rotational motion imparted by the

the driving unit and the pressure applied by the pressing unit recited in claim 1 results in the distinctive patterns shown in Figs. 5 and 6 which are completely different from the continuous donut-shaped locus in Mimami.

Likewise, amended independent claim 7 requires the steps of driving the polishing sheet to impart a roulette-like motion to the polishing sheet while rotating the polishing sheet about a rotational axis, and pressing a workpiece during driving of the polishing sheet to bring an end face of the workpiece into pressure contact with the polishing surface so that the polishing surface lies in a plane parallel to the end face of the workpiece. Accordingly, amended independent claim 7 distinguishes from Minami for the reasons set forth above for amended independent claim 1.

Since Minami does not disclose or describe the foregoing subject matter recited in amended independent claims 1 and 7, there can be no anticipation by Minami of independent claims 1 and 7 under 35 U.S.C. §102(a). That is, since each and every limitation of independent claims 1 and 7 is not found in Minami, the reference does not anticipate the claimed invention. See In re Lange, 209 USPQ 288, 293 (CCPA 1981). Furthermore, Minami does not suggest the claimed subject matter and, therefore, would not have motivated one skilled in the art to modify Minami's end surface polishing machine to arrive at the claimed invention.

Claim 15 depends on and contains all of the limitations of amended independent claim 7 and, therefore, distinguishes from the reference at least in the same manner as claim 7.

In view of the foregoing, applicants respectfully request that the rejection of claims 1, 7 and 15 under 35 U.S.C. §102(a) as being anticipated by Minami be withdrawn.

Rejection Under 35 U.S.C. §103(a)

Claims 8-13 were rejected under 35 U.S.C. §103(a) as being unpatentable over Minami. Applicants respectfully traverse this rejection and submit that the teachings of Minami do not disclose or suggest the subject matter recited in amended claims 8-13.

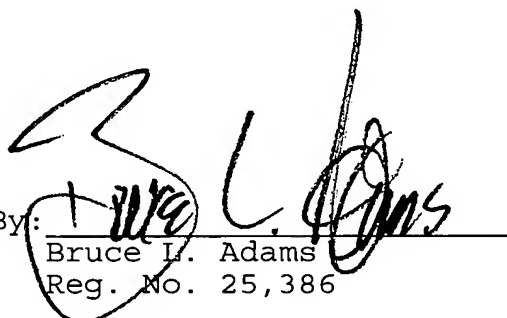
Minami does not disclose or suggest the subject matter recited in amended independent claim 7 as set forth above for the rejection of claims 1, 7 and 15 under 35 U.S.C. §102(a). Claims 8-13 depend on and contain all of the limitations of amended independent claim 7 and, therefore, distinguish from the references at least in the same manner as claim 7.

In view of the foregoing, applicants respectfully request that the rejection of claims 8-13 under 35 U.S.C. §103(a) as being unpatentable over Minami be withdrawn.

In view of the foregoing amendments and discussion,
the application is believed to be in condition for allowance.
Accordingly, favorable reconsideration and allowance of the
claims are most respectfully requested.

Respectfully submitted,

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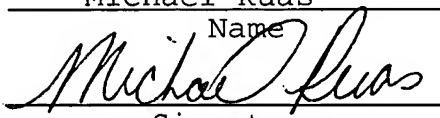
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